

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Patent Application of:  
Sean J Hart et al.

Application No.: 10/673,351

Confirmation No.: 8470

Filed: September 30, 2003

Art Unit: 1723

For: SEPARATION OF COLLOIDAL  
SUSPENSIONS USING LASER OPTICAL  
PRESSURE FLUIDIC DEVICES

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Examiner: J. W. Drodge

**SECOND AMENDED APPEAL BRIEF**

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This brief is in response to the Notification on Non-Compliant Appeal Brief dated  
December 7, 2006.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37  
and M.P.E.P. § 1206:

- |            |   |
|------------|---|
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**I. REAL PARTY IN INTEREST**

The real party in interest for this appeal is: The Government of the United States of America, as represented by the Secretary of the Navy

**II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS**

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

**III. STATUS OF CLAIMS**

**A. Total Number of Claims in Application**

There are 8 claims pending in application.

**B. Current Status of Claims**

1. Claims canceled: 1-10
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: 11-18
4. Claims allowed: None
5. Claims rejected: 11-18

**C. Claims On Appeal**

The claims on appeal are claims 11-18

**IV. STATUS OF AMENDMENTS**

Applicant did not file an Amendment After Final Rejection.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention is drawn to optical pressure, or more specifically, to affecting particles in a fluid via optical pressure.

An aspect of the present invention is drawn to a flowcell having a fluid pathway, for example as illustrated in Figure 1. Figure 1 illustrates optical pressure in a flowcell 140, wherein a fluid flows down the fluid pathway in a first direction (150) whereas a light beam 110 travels from a laser 100 up the fluid pathway in a second direction opposite the first direction. The light beam 110

creates optical pressure on certain particles  $Z_1$  and  $Z_2$  within the fluid in the pathway. The particles, experiencing laser pressure, move in the direction of laser propagation, away from the focal point 130 against the liquid flow 150. The particles then come to rest when the optical pressure force on the particles equals the force due to the liquid flow (please note discussion on page 13 of the specification, the first full paragraph).

Independent claim 11 recites a device (for example as illustrated in Figure 5a) comprising: a poly(dimehtylsilozane) (PDMS) body (please note page 16, line 8 of specification) having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough (please note item 510 of Figure 5a, and discussion on page 16, lines 11-12); and a light input part (please note item 530 of Figure 5a, and discussion on page 16, line 18 through page 17, line 1) arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction (please note discussion of flowcell on page 14, second paragraph).

Independent claim 13 recites a device (for example as illustrated in Figure 5a) comprising: a body (please note page 16, line 8 of specification) comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough (please note item 510 of Figure 5, and discussion on page 16, lines 11-12); and a light input part (please note item 530 of Figure 5, and discussion on page 16, line 18 through page 17, line 1) on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction (please note discussion of flowcell on page 14, second paragraph), wherein said first material is different from said second material (please note item 530 of Figure 5, and discussion on page 16, line 18 through page 17, line 1).

Independent claim 17 recites a system (please note Figure 7 and discussion on page 18, line 6 through page 19, line 12) comprising: a light source operable to emit light (item 700); and a PDMS body (please note page 16, line 8 of specification) having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough (please note item 510 of Figure 5, and discussion on page 16, lines 11-12), wherein said body is arranged to accept the light and permit the light to travel

into said PDMS body and through said fluid pathway in a second direction opposite of the first direction (please note discussion of flowcell on page 14, second paragraph).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The first ground of rejection to be reviewed on appeal, with reference to page 2 of the final Office action dated March 22, 2006, is whether Dapprich anticipates the invention recited in claims 11 and 12?

The second ground of rejection to be reviewed on appeal, with reference to page 2 of the final Office action, is whether Dapprich anticipates the invention recited in claims 13-16?

The third ground of rejection to be reviewed on appeal, with reference to page 2 of the final Office action, is whether Dapprich anticipates the invention recited in claims 17 and 18?

## VII. ARGUMENT

A.) It is respectfully submitted that Dapprich fails to anticipate the invention recited in independent claim 11.

As pointed out on page 2, paragraph 3 of the After Final Response, an aspect of the present invention is drawn to a flowcell having a fluid pathway. for example as illustrated in Figure 2. **A fluid flows down the fluid pathway in a first direction whereas a light beam travels up the fluid pathway in a second direction opposite the first direction.** (Emphasis added) The light beam creates optical pressure on certain particles within the fluid in the pathway.

As pointed out on page 2, paragraph 4 of the After Final Response, independent claim 11 recites, *inter alia*,

**“a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough” and “a light input part arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.”** (Emphasis Added)

The final Office action fails to specifically address the limitations of claim 11 discussed above. Presumably to shed light on the basis for the rejection of claim 11, the comments in the Advisory Action dated June 23, 2006, seem to indicate that because a device disclosed in Dapprich

is capable of accepting light from a first direction and permitting the light to flow in a reverse direction, then such a device anticipates claim 11. It is respectfully submitted that such an assertion is incorrect.

Contrary to the assertion in the Advisory Action, the After Final Response **does not argue** that Dapprich fails to disclose “a fluid pathway having a ‘light input part’ (such as a mirror or reflector) arranged to **accept light from a first direction and permit such light to flow in a reverse direction.**” (Emphasis Added) The clear language of the claims and the arguments for patentability thereof are different than the position taken in the Advisory Action.

Again, the final Office action fails to specifically address the limitations of claim 11 discussed above. However, the Advisory Action indicates that column 12, lines 22-26 and 49-67 of Dapprich states that “the disclosed microstructures, themselves, contain reflectors, mirrors and other optical devices for controlling direction of fluid flow.” This statement is incorrect. The cited portion of Dapprich in no way indicates that the reflectors, mirrors and other optical devices are for “controlling the direction of fluid flow.” In any event, the exact subject matter claimed must be described by the allegedly anticipating reference. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1349 (Fed. Cir. 1998).

In the present case, Dapprich fails to disclose the exact subject matter recited in independent claim 11. More specifically, Dapprich fails to disclose:

“a PDMS body having a fluid pathway arranged **to permit flow of a fluid in a first direction therethrough**” and “a light input part arranged to accept input light and **permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.**” (Emphasis Added)

Dapprich generally discloses optical devices with microfluidic structures as follows:

- Column 12, lines 22-26 discloses that the, “microstructures of the present invention may also comprise one or more optical components, including refractive and reflective components such as lenses and mirrors, and diffractive components such as input-coupler gratings, fresnel lenses, and holographic components.”
- Column 12, lines 27-43 discloses techniques for manufacturing microstructures comprising one or more optical components.

- Column 12, lines 47-58 discloses an embodiment of a microstructure having a concave reflective surface. As illustrated in FIG. 9, light 68, from sample 70 is reflected off concave reflecting surface 62 and onto detector 66.
- Column 12, line 59 through column 13, line 44 provide a litany of examples of optical devices in microstructures including: diffractive optical elements “for sample illumination or readout such as total internal reflection and evanescent wave excitation (Column 13, lines 3-14); optical additives “to suppress excitation light scattering and internal fluorescence, including PDMS autofluorescence, while permitting a desired signal (e.g., sample fluorescence) to penetrate a microstructure to a detector (Column 13, lines 16-29); and waveguides “for localized excitation of samples within a microstructure at specific wavelengths” (Column 13, lines 30-43).

Nowhere within Dapprich is a disclosure of fluid flowing down a fluid pathway in a first direction whereas a light beam travels up the fluid pathway in a second direction opposite the first direction. Accordingly, Dapprich fails to disclose that which is recited in independent claim 11. Because Dapprich fails to disclose the exact subject matter recited in independent claim 11, in light of *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1349 (Fed. Cir. 1998), claim 11 is novel over Dapprich within the meaning of 35 U.S.C. § 102.

Claim 12 is dependent upon claim 11, and therefore includes all the limitations thereof. As such, claim 12 is novel over Dapprich for at least the same reason that claim 11 is novel over Dapprich.

B.) It is respectfully submitted that Dapprich fails to anticipate the invention recited in independent claim 13.

As pointed out on page 2, paragraph 5 of the After Final Response, independent claim 13 recites, *inter alia*,

“a body comprising a first material and having a fluid pathway arranged to **permit flow of a fluid in a first direction therethrough**,” and “a light input part on said body and comprising a second material, said light input part being arranged to accept input light and **permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction**.” (Emphasis Added)

The final Office action fails to specifically address the limitations of claim 13 discussed above. Presumably, the discussion in the Advisory Action is provided as support for the rejection of claim 13. However, as discussed above, the portion of Dapprich cited in the Advisory in no way indicates that the reflectors, mirrors and other optical devices are for “controlling the direction of fluid flow.” In any event, the exact subject matter claimed must be described by the allegedly anticipating reference. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1349 (Fed. Cir. 1998).

As discussed above, nowhere within Dapprich is a disclosure of fluid flowing down a fluid pathway in a first direction whereas a light beam travels up the fluid pathway in a second direction opposite the first direction. Accordingly, Dapprich fails to disclose the exact subject matter recited in independent claim 13. More specifically, Dapprich fails to disclose:

“a body comprising a first material and having a fluid pathway arranged to **permit flow of a fluid in a first direction therethrough**,” and “a light input part on said body and comprising a second material, said light input part being arranged to accept input light and **permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction**.” (Emphasis Added)

Because Dapprich fails to disclose the exact subject matter recited in independent claim 13, in light of *C.R. Bard, Inc. v. M3 Sys., Inc.*, (Fed. Cir. 1998), claim 13 is novel over Dapprich within the meaning of 35 U.S.C. § 102.

Each of claims 14-16 are dependent upon claim 13, and therefore includes all the limitations thereof. As such, each of claims 14-16 is novel over Dapprich for at least the same reason that claim 13 is novel over Dapprich.

C.) It is respectfully submitted that Dapprich fails to anticipate the invention recited in independent claim 17.

In the present case, Dapprich fails to disclose the exact subject matter recited in independent claim 17. More specifically, Dapprich fails to disclose:

“a PDMS body having a fluid pathway arranged to **permit flow of a fluid in a first direction therethrough**” and “a light input part arranged to accept input light and **permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction**.” (Emphasis Added)

The final Office action merely indicates that for claims 17 and 18, “also see light source 68,70, etc. (column 11, lines 43-48 and cloumn 12, lines 53-58. [sic] column 13, lines 20-44, etc.).” Presumably, the discussion in the Advisory Action is additionally provided as support for the rejection of claim 17. However, as discussed above, the portion of Dapprich cited in the Advisory in no way indicates that the reflectors, mirrors and other optical devices are for “controlling the direction of fluid flow.” In any event, the exact subject matter claimed must be described by the allegedly anticipating reference. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1349 (Fed. Cir. 1998).

Accordingly, Dapprich fails to disclose that which is recited in independent claim 17. Because Dapprich fails to disclose the exact subject matter recited in independent claim 17, in light of *C.R. Bard, Inc. v. M3 Sys., Inc.*, (Fed. Cir. 1998), claim 17 is novel over Dapprich within the meaning of 35 U.S.C. § 102.

Still further, claim 18 is dependent upon claim 17, and therefore includes all the limitations thereof. As such, claim 18 is novel over Dapprich for at least the same reason that claim 17 is novel over Dapprich.

In light of the above, it is clear that claims 11-18 are novel over the prior art of record, an indication of which is respectfully solicited.

## VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A do include the amendments filed by Applicant on February 23, 2006.

## IX. EVIDENCE

No evidence pursuant to §§ 1.130, 1.131, or 1.132 is being submitted. USPN 6,585,939 to Dapprich, which was entered by the Examiner in the Office action dated March 22, 2006, is being submitted in Appendix B.



**X. RELATED PROCEEDINGS**

No related proceedings are referenced in section II above, or copies of decisions in related proceedings are not provided. Please see Appendix C.

Dated: January 8, 2007

Respectfully submitted,

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**APPENDIX A**

**Claims Involved in the Appeal of Application Serial No. 10/673,351**

11. A device comprising:

a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough; and

a light input part arranged to accept input light and permit the input light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.

12. The device of claim 11, further comprising a light manipulating part operable to manipulate the input light to travel through a specific portion of said fluid pathway.

13. A device comprising:

a body comprising a first material and having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough; and

a light input part on said body and comprising a second material, said light input part being arranged to accept input light and permit the input light to travel into said body and through said fluid pathway in a second direction opposite of the first direction,

wherein said first material is different from said second material.

14. The device of claim 13, wherein said body comprises PDMS.

15. The device of claim 13, wherein said light input part comprises glass.

16. The device of claim 13, further comprising a light manipulating part operable to manipulate the input light to travel through a specific portion of said fluid pathway.

17. A system comprising:

a light source operable to emit light; and

a PDMS body having a fluid pathway arranged to permit flow of a fluid in a first direction therethrough,

wherein said body is arranged to accept the light and permit the light to travel into said PDMS body and through said fluid pathway in a second direction opposite of the first direction.

18. The device of claim 17, further comprising a light manipulating part operable to manipulate the input light to travel through a specific portion of said fluid pathway.

**APPENDIX B**

**Evidence entered by the examiner and relied upon by appellant in appeal:**

USPN 6,585,939 to Dapprich was entered into the record by the Examiner in page 2 of the Office action dated March 22, 2006. A copy of USPN 6,585,939 follows.

**APPENDIX C**

**Related Proceedings**

None.